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mitted. In such communities it is still believed that, intellectually speaking, "all men are born equal," or nearly so. In such places a fluent expression of interest in some form of human progress, will be regarded as identical with ability to aid in that form of human progress.

Since academies of sciences in this country are not yet sustained by government grants, it will be necessary to have a lay membership, whose annual dues will meet the necessary expenses. There should therefore be two degrees of association, viz., membership and fellowship; the latter to be conferred exclusively on persons who have contributed important work to the progress of science, chiefly of original research. Such fellowship becomes an order of merit, which serves both as a stimulus and as a reward for work.

The local academies of science hitherto established, generally possess libraries and museums. This property may become a great evil, as, for instance, when its conservators claim equal place in the councils of the academy with the scientific men. But it could be administered by a financial or property committee of lay members, who should act with the fellows, when management of financial matters is in question.

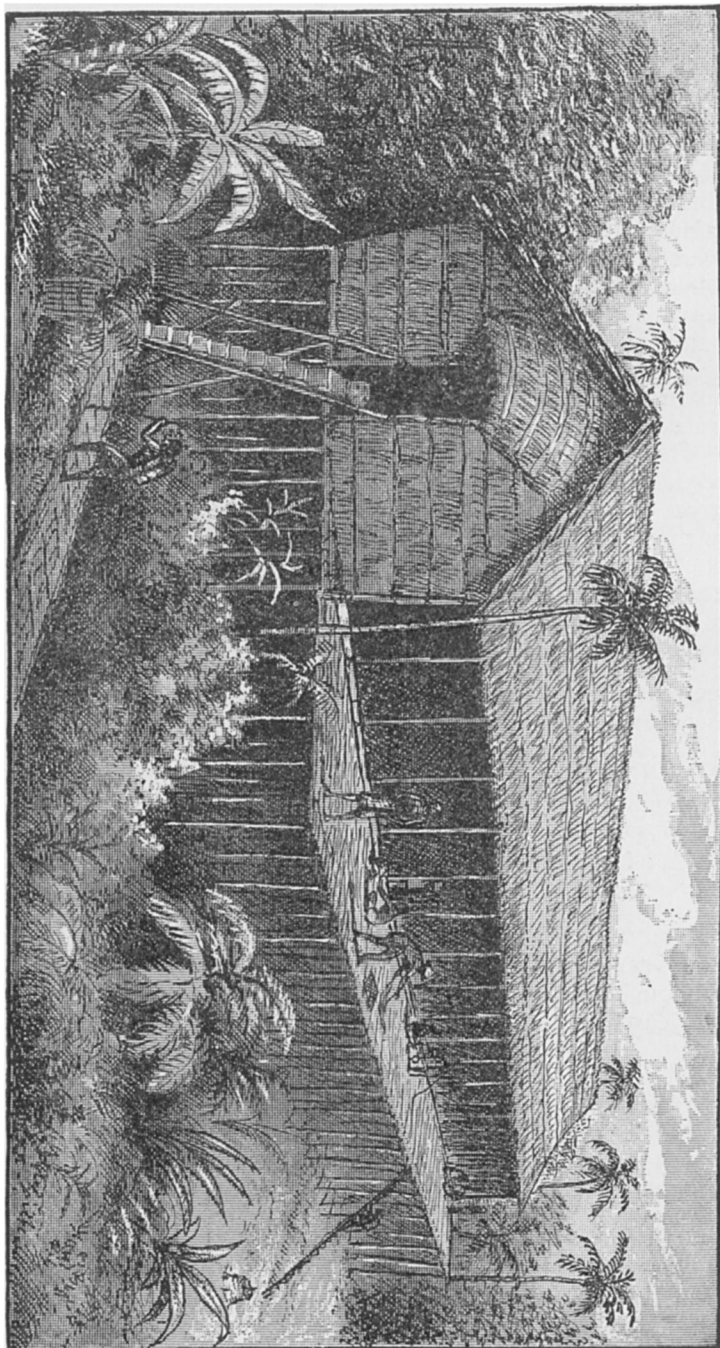
— The numbers of the *AMERICAN NATURALIST* for 1885 were issued at the following dates: January, Dec. 30th, 1884; February, Jan. 19th, 1885; March, Feb. 24th; April, March 21st; May, April 20th; June, May 18th; July, June 20th; August, July 28th; September, Aug. 15th; October, Sept. 22d; November, Oct. 23d; December, Nov. 25th.

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RECENT LITERATURE.

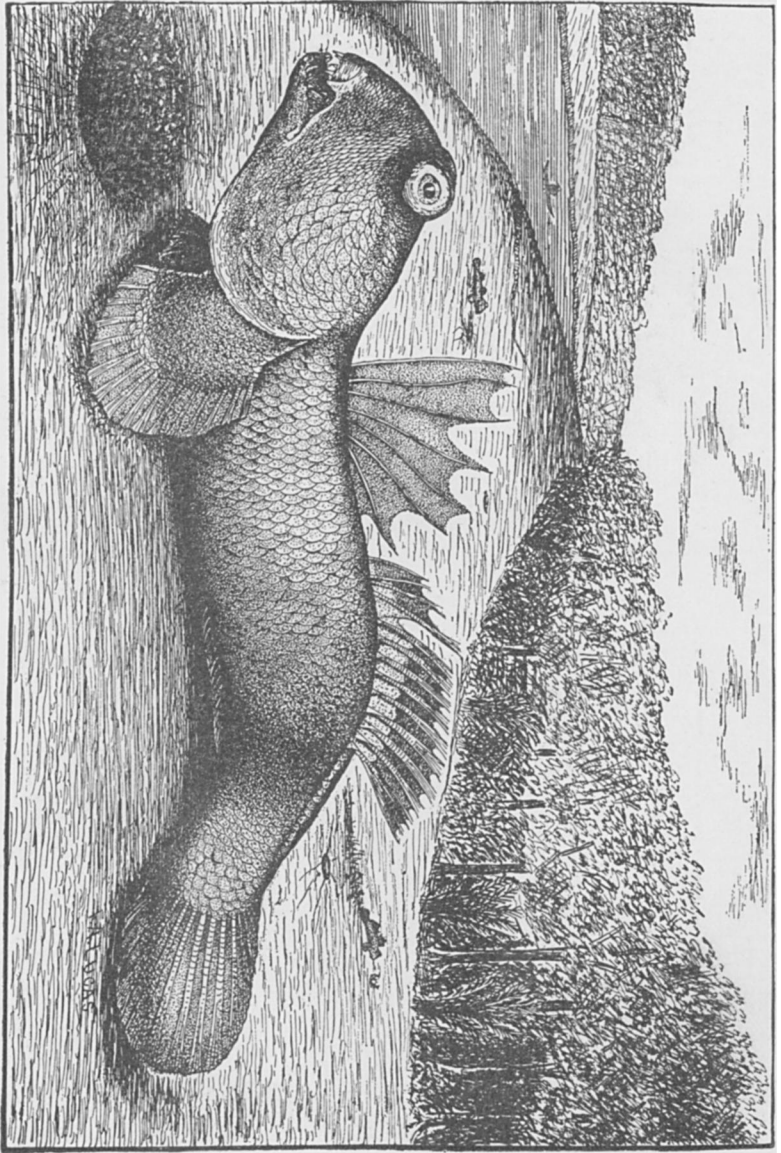
HORNADAY'S *TWO YEARS IN THE JUNGLE*.¹—The author spent two years in the East Indies dividing his time between India, Ceylon, the Malay peninsula and Borneo, collecting specimens for Ward's establishment at Rochester. Wherever he went Mr. Hornaday kept his eyes open. Of apparently a hardy, iron constitution, which was not subdued by repeated attacks of the jungle fever, of great industry and bravery, and withal a good storyteller, the result is one of our best books of travel in countries which have been ransacked by English and German travelers. The interest of the narrative is sustained throughout, and if at times too much slang is introduced, we forgive these slight derelictions in view of the manifest honesty, kind-heartedness and scientific zeal of the author. Though by profession a taxider-

¹ *Two Years in the Jungle*.—The experiences of a hunter and naturalist in India, Ceylon, the Malay peninsula and Borneo. By WILLIAM T. HORNADAY, with maps and illustrations. New York, Charles Scribner's Sons. 1885. 12mo, pp. 512. \$4.00.



EXTERIOR OF SEA DYAK LONG-HOUSE.

(Sketched by the Author.)



THE JUMPING FISH.—(*Pseudophthalmus Schiörsneri*.)
(Drawn by F. A. Lucas, from a specimen.)

mist and collector, *Two Years in the Jungle* abounds in observations on the physical geography, ethnography, zoölogy and botany of the countries visited. We get a clear idea of Western India, its people, their castes, of British rule, on the whole so beneficent, as well as how to skeletonize elephants, skin monkeys, crocodiles, tigers, snakes and oranges. The maps are convenient and the illustrations numerous, new and fresh, if not always excellent from an artistic point of view. These which we have been permitted to introduce are fair specimens of the plates. Among the more valuable contributions to zoölogy are the portions referring to the elephant, its natural history and psychology, the crocodiles and gavials, the oranges and gibbons, the sharks, particularly that strange connecting link between the sharks and skates, *Rhamphobates*, down to the jumping fish. If Mr. Hornaday in slaying elephants showed rare nerve and skill as a marksman, quite another set of qualities were brought into play in catching these odd fish. These creatures live on the mud flats of the Siamese rivers, hopping about over the deep mud, feeding on the tiny crustaceans left on the bank by the receding tide; but we will let the author tell the story in his own way:

"The Malays were thunderstruck when I pulled off my shoes and told them to put me ashore. Seeing that I was really going, Francis, like a good boy, did not hesitate to follow, and we stepped out of the sampan into mud and water hip deep.

"We will never know the actual depth of the mud on that bank, but we sank into it to our knees at every step, and were fortunate enough to stop sinking at that point. What a circus it must have been for those who looked on! But, in for a penny in for a pound, and bidding Francis choose the largest fish when possible, we went for them. There were probably a dozen in sight, hopping spasmodically about, or lying at rest on the mud, but when we selected the nearest large specimens and made for them, they developed surprising energy and speed, and made straight for their burrows. They progressed by a series of short but rapidly repeated jumps, accomplished by bending the hinder third of the body sharply around to the left, then straightening it very suddenly, and at the same instant lifting the front half of the body clear of the ground by means of the arm-like pectoral fins which act like the front flippers of a sea lion. These fins are almost like arms in their structure and use, the bones being of great length, and thus giving the member great freedom of movement. Owing to the soft and yielding nature of the mud the leaps were short, about six inches being the distance gained each time, but they were so rapid, the mud so very deep and our progress so slow, the fish always succeeded in getting into their holes before we could reach them. Their burrows were simply mud holes, going straight down to a depth of three to four feet, large enough in diameter to admit a man's arm easily, and, of

course, full of water. Although the mud was soft, it was not sticky, and we were able to use our hands for spades very effectually. By digging a big hole two feet deep, and standing on one's head in the bottom of it, we were able to reach an arm down two feet farther and seize our fish at the bottom of the burrow. Lucky it was for us that they had no sharp and poisonous spines, like the mud-laff which stung me in Singapore and paralyzed my right hand for some hours.

"My first fish was hard to get and hard to hold, but in the immortal words of *The Shaughraun*, 'Begorra, 'twas worth it.'"

In hunting tigers and elephants, the most dangerous game in the world, Mr. Hornaday proved himself a mighty Nimrod. He naturally has much to say of the elephant, and we are surprised to learn that in such a populous country as India the animal is on the increase. Though at present they are rigidly protected by law, it is evident that their number will soon increase to such an extent "as to render further elephant shooting positively necessary."

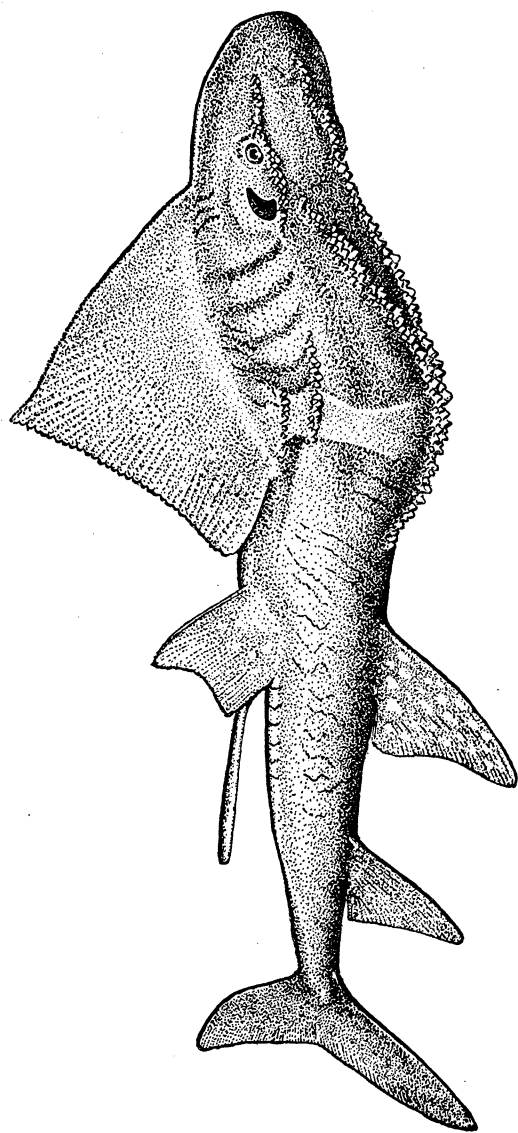
The height of the Indian elephant is, the author claims, like that of nearly all large animals, usually recorded in exceptional figures. "Even the best scientific writers are apt to fall into the habit of giving the largest measurements fairly obtainable, which therefore brings the average animal far below the standard they set up. I can scarcely recall an instance of having shot a mammal, even out of a score of the same species, which came up to the measurements recorded by Jerdon in his *Mammals of India*. The height of the male *Elephas indicus* should be recorded as nine feet six inches, vertical measurement, at the shoulder, and the female eight feet, for these figures represent the height of from eight to twelve individuals to be found in every hundred; in other words; animals which can be seen without searching throughout the length and breadth of India."

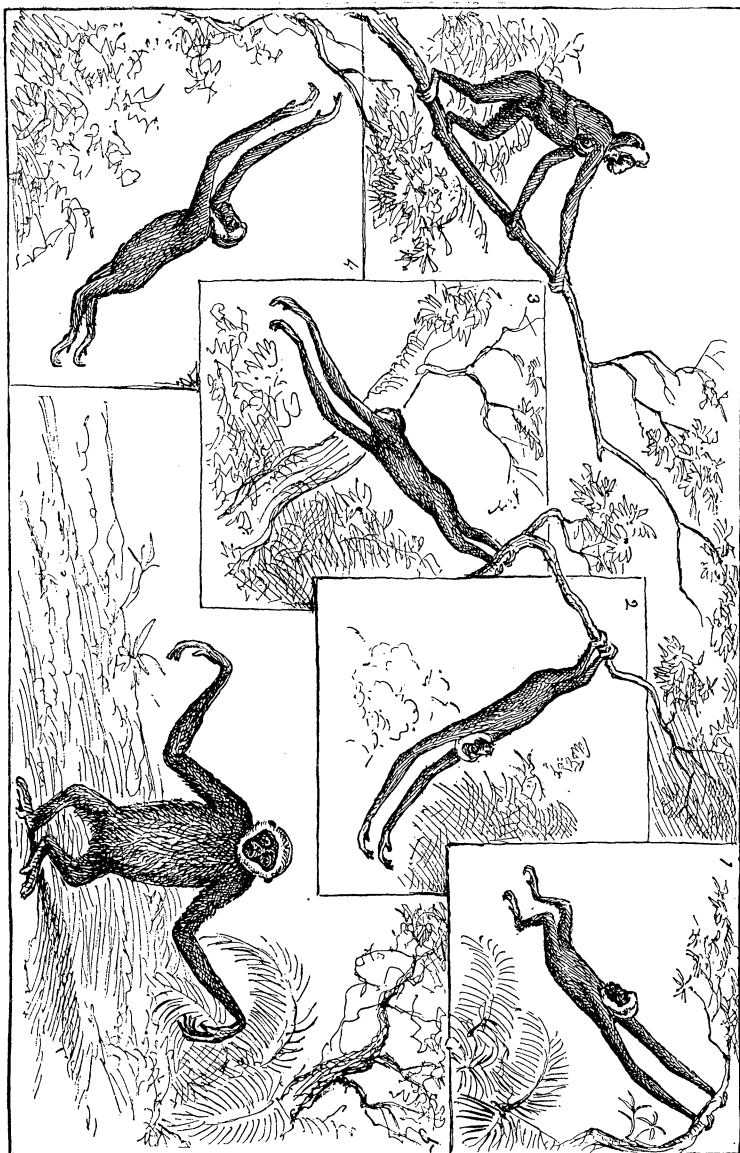
The height of the Indian elephant is everywhere recorded as from ten to ten and a half feet, but the largest one ever measured "was a tusker described by Mr. Corse in 1799 as belonging to Asaph-ul-Daula, a former Vizier of Oudh, which really measured ten feet six inches, perpendicularly at the shoulder. This animal was merely one out of ten thousand, and it would be quite as sensible to measure Chang and record the height of Chinamen as being seven and a half feet, as to say that the Indian elephant is as tall as the Vizier's giant."

Our author spent a month with the Dyaks in Borneo, orang hunting, his trophies now adorning the National Museum at Washington. His account of the two species of orang (*Simia wurmbeii* and *satyrus*) inhabiting Borneo, is detailed, and stamped with the mark of accuracy. The nesting habits were observed and described as follows: "I got there just in time to see the orang build a large nest for himself. He took up a position in a

PHAMPHOBATIS ANCYLOSTOMUS. (GILL.)

(From a sketch by the Author.)





THE GIBBON'S MODES OF PROGRESSION.
 (From sketches by the Author.)
 1-4. Swinging through the tree-tops.—5. Walking on level ground.—6. Climbing through the tree-tops.

fork which was well screened by the foliage, and began to break off small branches and pile them loosely in the crotch. There was no attempt at weaving, nor even regularity in anything. He reached out his long, hairy arm, snapped off the leafy branches with a practiced hand, and laid them down with the broken ends sticking out. He presently got on the pile with his feet, and standing there to weight it down he turned slowly, breaking branches all the while and laying them across the pile in front of him, until he had built quite a large nest. When he had finished he laid down upon it, and was so effectually screened from us that I could not dislodge him, and after two or three shots I told the natives they would have to cut the tree." During one day's travel along the Upper Simujan river, Mr. Hornaday counted thirty-six old nests and six which were regarded as new or fresh. He thinks that an orang after building a nest sleeps in it several nights in succession, unless he leaves its neighborhood altogether. He never saw nor heard of any house-building by orang-utans, though he was led to believe that some individuals may have a habit of covering their bodies with branches for protection against the dashing of the rain drops during a heavy storm. "My little pet orang," he says, "would invariably cover his head and body with straw or loose clothing the moment it began to rain, even though he was under a roof."

Forty-three orangs were shot by Mr. Hornaday and his hunters, and of these seven exceeded the maximum height as given by Mr. Wallace, viz., four feet two inches. "My tallest *Simia wurbii* or 'mias chappin,' measured four feet six inches from head to heel, and the next in size four feet five and a half inches. Then a *satyrus*, or 'mias rombi,' measured four feet four and a half inches, two other *wurbii* four feet four inches, and four feet three inches respectively, a *satyrus* four feet three inches, and a *wurbii* four feet two and a half inches."

The account of the gibbons and other animals of Borneo, its forests and of the Dyaks are interesting—indeed there is not a dull page in the book. Besides the general map there is an ethnographic map of Borneo, showing the distribution of the Dyak tribes and subtribes, as classified by the author. Much ethnographic material is given, with frequent illustrations. We see little in point of fact to criticise, except where the author speaks of nummulites as "little flat echinoderms."

GOODALE'S VEGETABLE PHYSIOLOGY.¹—Early in the past year we had the pleasure of noticing the first part of this work, which is now completed by the appearance of Part II. The chapters in the part before us deal successively with, Protoplasm in its rela-

¹ *Gray's Botanical Text-Book* (Sixth Edition), Vol. II. Physiological Botany. II. Vegetable Physiology. By GEORGE LINCOLN GOODALE, A.M., M.D., Professor of Botany in Harvard University. Ivison, Blakeman, Taylor & Company, New York and Chicago, 1885. pp. xxi. 195 to 500+36. Illustrations 142 to 214.